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Identification and Characterization of an Iron-Regulated Outer Membrane Protein in *Salmonella typhimurium*

Yang, Jiseon, Young Hee Kim, Ah Young Yoo,
Sam Woong Kim and Ho Young Kang

Department of Microbiology, Division of Biological Sciences College of Natural Sciences,
Pusan National University, Busan 609-735

In considering *Salmonella*'s success at being a pathogen, a first attribution would be an ability to synthesize adhesins that would enable *Salmonella* to successfully adhere to tissue upon oral entry into inside of the host. On the basis of *S. typhimurium* grown under iron-replete condition adheres better to the host cells than that grown in iron-replete conditions, we detected and identified a outer membrane protein expressed under high iron condition. The results of N-terminal sequences and MALDI-TOF analysis of the protein confirmed outer membrane protein W (OmpW) of *Salmonella*. We have constructed an *ompW* deletion mutant, CK10, through allelic exchange method. The CK10 strain lacked the expression of high-iron specific 23 kDa protein, verifying that the 23 kDa protein is the OmpW protein. CK10 strain did not have significant differences for the growth pattern, SDS tolerance activity, expression of type 1 fimbriae and membrane hydrophobicity compare to those of in wild-type. The patterns of secreted proteins in CK10 strain under high or low iron condition were similar to those of wt *Salmonella,* indicating OmpW may not involved in the protein secretion inducing type III secretion system (TTSS). Iron-responsive expression of 23 kDa OmpW was evidenced with results from SDS-PAGE analysis, transcripts detection by RT-PCR and β-galactosidase assay with *ompW::lacZYA* fusion. It was confirmed that the iron-responsiveness of *ompW* expression is the consequence of differential transcription under iron-replete or iron-deplete conditions. In the *Salmonella fur* mutant, the protein was expressed under high-iron conditions, which indicates the OmpW is expressed Fur independent manner. To use in the future experiments, OmpW-specific polyclonal antibody was produced. Experiments elucidating the regulatory mechanism of iron-responsive *ompW* gene expression are under way. All results described in this study are the first time regarding the *Salmonella* OmpW.